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ABSTRACT

One of the problems found in present readability formulas is the lack of control for syntax, other than sentence length. Judging the complexity of a sentence based on word count alone does not allow for such circumstances as: coordinate clauses joined by "and"; deletions; passive forms; and coordinate clauses, dependent clauses, and participles. The Syntactic Complexity Formula was developed to provide a more reliable and valid guide for the control of syntactic complexity. The formula is based on transformational grammar theory, experimental data on children's processing of syntactic structures, and language development and performance studies of the oral and written language used by children. The research findings which proved most helpful in determining which syntactic structures are most familiar and easily understood included: that a typical order seems to exist in the acquisition of language; that a very few sentence forms make up a substantial part of the child's oral and written syntax; and that the direction of language maturity in the child's use of language entails the use of subordination, participles, gerunds, appositives, and nominal absolutes. (WR)

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AERA Symposium
Trends in Readability Research

"Background for a New Syntactic Complexity Formula"

by Alvin Granowsky

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Readability depends on many variables. Chief among them are content, coherence, vocabulary load and syntactic complexity. Most people would agree that the first two, content and coherence, are basic key factors in making a story "readable". In other words, a good story, well presented, will override other considerations in holding the reader's thought and attention.

Content and coherence, however, cannot be measured by quantifiable means; so in discussing readability, we fall back on intuition and informal guidelines concerning these two essential variables. In practice then, questions concerning the control of readability usually resolve themselves to: given a good story and a good writer, who can blend sentences together coherently, what can be done with vocabulary and syntax to make the story even more readable?

When it comes to controlling vocabulary, several sources are available which suggest the frequency of occurrence of words in oral and written language.[1] With these resources, it is generally believed that more readable materials can be written for children by using the frequently used words. Klare (1968) observed in his summary of research concerning the role of word frequency in determining readability:

> Frequency of occurrence of words, as this paper indicates clearly, plays an all-pervasive role in language usage. Not only do humans tend to use some words more often than

1. The Teachers Word Book of 30,000 Words, Thorndike and Lorge
   Predicting Readability Levels, Botel
   The Spache Readability Formula
   The Dale-Chall Readability Formula

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> others, they recognize more frequent words more rapidly than less frequent, prefer them and understand and learn them more readily. It is not surprising, therefore, that this variable has such a central role in the measurement of readability. (p. 15)

To date syntax has played only a small role in controlling readability. As researchers have noted, shortened sentence length appeared to be the only consistent syntactic control used in the basal readers analyzed. This finding could be anticipated from the fact that sentence length is the only syntactic measure in readability formulas generally used to control reading difficulty of elementary grade materials, (for example, the Dale-Chall formula, 1948, and the Spache formula, 1953).

But sentence length offers little indication of the grammatical makeup and complexity of a sentence. As syntactic analyses based on transformational grammar indicate, the complexity of a sentence should not be judged from a word count of the sentence read. For example, Shakespeare's "To be or not to be: that is the question," would be rated as having primary level difficulty in terms of sentence length (and vocabulary frequency).

Shortcomings in use of a word count to judge complexity readily appear. The following are only a few of the many examples that occur:

A. Coordinate clauses joined by <u>and</u>

1. I went to the store. I bought milk for dinner.
2. I went to the store, and I bought milk for dinner.

Sentence 2 has more than twice the number of words than either of the sentences in number 1. By a word count, therefore, it would be judged to be far more complex than the reading situation presented in 1.

However, both research and intuition question the judging of the reading situation presented in 2 as measurably more complex.

B. Deletions

1. Suzy went to the party, and she danced all night.
2. Suzy went to the party and danced all night.

and

1. Jack, who was chasing after his dog, tripped over a stone.
2. Jack, chasing after his dog, tripped over a stone.

Judging by a word count, the reading situation in sentences 2 should be easier than in sentences 1. But, are they? Again, both research and intuition suggest that the reading situation in the shorter sentences are more difficult.

C. Prepositional phrases

1. John went home.
2. John went to his home.

Prepositional phrases abound in the language, and as a result this syntactic structure plays an important part in expanding a sentence's length. The concern here is how much weight should be given the prepositional phrase in considering a sentence's complexity. In this example, sentence 2 is substantially longer than 1 because of the use of a prepositional phrase. But the meaning of the two sentences is identical, and intuition offers little reason to judge sentence 2 more difficult than 1.

D. Passives

1. John hit Jack.
2. Jack was hit by John.
3. Jack was hit. (<u>by John</u> understood from context).

By a word count, all three sentences would rank at the easiest readability level. Yet research shows the passive forms in 2 and 3 results

in many failures of comprehension because the expected order of the subject as the actor has been altered. And 3, which is shorter than 2 is probably the most complex because the reader must pick up from context who the actor was.

E. Coordinate clauses, Dependent clauses, Participles

1. Donna was running to the pool and she slipped.
2. Donna, who was running to the pool, slipped.
3. Donna, running to the pool, slipped.

How much help does a word count offer here as a guide in judging the relative complexity of sentences 1, 2, and 3? Sentence 3 is one-third shorter than sentence 1. But would anyone judge it to be easier to read? and understand? It is probably the most complex of the three sentences.

These few examples offer some indication of the limited validity and guidance offered by a word count to control syntactic complexity in any specific reading situation. Other generally used measures of syntactic complexity offer even less guidance. The number of prepositional phrases or proportion of dependent clauses used in a passage correlate somewhat with reading complexity, but in no way indicate the relative complexity of the major portion of syntactic structures found in reading materials.

In an attempt to overcome the absence of a reliable and valid guide for the control of syntactic complexity, a heuristic was developed: The Syntactic Complexity Formula.[1] The formula is based on (1) transformational grammar theory, which suggests that complex sentences can

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1. Botel, M. and Granowsky, A.,"A Formula for Measuring Syntactic Complexity: A Directional Effort" - Elementary English, April 1972

be thought of as derived from processes of adding underlying structures (simple sentences for our purposes); (2) experimental data on children's processing of syntactic structures; and (3) language development and performance studies of the oral and written language used by children.[2]

In determining which syntactic structures are most familiar and easily understood, and hence most readable, these research findings proved helpful:

a.) A "typical" order seems to exist in the acquisition of language. This means that while children may be at different levels of syntactic competence, they can all be expected to have understanding of basic sentence forms (Subject-Verb-Object, or Subject-Verb-Complement, for example) and simple transformations occurring in the early stages of language acquisition (negatives and questions, for example).

b.) Language performance studies have found that a very few sentence forms make up a substantial part of the child's oral and written syntax. It would seem that these relatively limited number of syntactic forms can be emphasized in the early reading situations.

c.) Language performance studies have noted the direction of increasing maturity in the child's use of language. This direction entails the use of subordination, especially those involving use of participles, gerunds, appositives, nominal absolutes, etc. It has also been noted that even older children from lower socio-economic groups rarely use these structures. Experimental data indicates that

2. Granowsky, A., A Formula for the Analysis of Syntactic Complexity of Primary Grade Reading Materials, University of Pennsylvania, Graduate School of Education, Unpublished Doctoral Dissertation, 1971.

these "later-appearing" syntactic structures present relatively difficult reading situations, especially for the young reader. These findings can be used as a route for evaluating and sequencing the relative complexity of syntactic structures.